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## **A Nature Walk a Day, Keeps Unhappiness Away: Restorative Campus Environments and Student Well-Being**

Justine Albert

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A NATURE WALK A DAY, KEEPS UNHAPPINESS AWAY:  
RESTORATIVE CAMPUS ENVIRONMENTS AND STUDENT WELL-BEING

by

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Submitted in Partial Fulfillment  
of the requirements for the degree of  
Bachelor of Arts  
in  
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Date

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## Abstract

The increasing world population is leading to rapid and extensive urbanization. This overstimulating built environment may be causing an increased rate of stress-related illnesses amongst urban populations. Similarly, to large cities, university campuses are also often centralized built environments brimming with activity and distraction, centered around student life, academic pursuits and communal events, resulting in a barrage of stimulation and distraction. Generally, university students spend the majority of their time immersed in these overstimulating campuses, engaging in activities that require sustained attention, which, similar to urban spaces, may cause mental and attentional fatigue leading to reduced well-being. Green spaces are restorative environments that may be effective in improving mental and emotional well-being, as past research suggests a positive association between green-spaces and increased well-being in urban populations. Despite the promising results, there has been a lack of research looking specifically at university campuses and whether campus green spaces are able to improve student psychological health, particularly during the winter season. The present study, therefore, examines the association between campus green spaces and student well-being by having participants answer questions regarding mental health after either walking through a busy part of campus or a natural, forested space. The results of the study were not significant; however, future researchers should continue to explore the effect of green spaces during the winter on student well-being.

*Keywords:* Restoration, Nature, Well-being, Campus, Green-Space

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## Introduction

The increasing world population is leading to rapid and expansive mass urbanization, especially in the Western world. Today one in two people live in towns and cities, and this number is expected to rise, ultimately leading to a loss of urban green space per capita and a decrease in daily exposure to natural environments (Petracht et al., 2012). The urban environment has become the new human habitat and it is predicted that by 2050, 70% of the world's population will be living in built environments (Stigsdotter et al., 2017). This rapid urbanization that has occurred since the industrial age has made it extremely challenging to create healthy living environments, as the urban industrial scenery largely limits outdoor recreation (Stigsdotter et al., 2010). For instance, typical European citizens spend 90% of their time inside while Americans spend 93% of their life indoors (Li, 2018).

Another major problem with living in an urban setting is mental fatigue, as people experience stimulation overload due to noise, crowded streets, traffic and fear of crime (Stigsdotter et al., 2017). These cityscapes usually provide few opportunities for restoration from urban stressors (Stigsdotter et al., 2017). The daily feelings of stress caused by urban stressors call upon the sympathetic nervous system or 'fight and flight' response, which has been linked to many stress-related illnesses such as heart disease, depression, anxiety and mental fatigue (Stigsdotter et al.).

Similar to the layout of a large city, university campuses are also often centralized built environments brimming with activity and distraction, centered around student life, academic pursuits and communal events, resulting in a barrage of stimulation and distraction. Generally, university students spend the majority of their time immersed in these overstimulating campuses,

engaging in activities that require sustained attention, which similar to urban spaces may cause mental and attentional fatigue leading to anxiety and depression. For instance, according to the 2016 Canadian National College Health Assessment, 44.4% of College students reported feeling depressed and 64.5% reported feeling overwhelming anxiety in the past 12 months (Canadian National College Health Assessment, 2016). Students could, therefore, benefit from having restorative environments integrated and embedded into the campus setting to allow them to participate in their daily activities feeling cognitively refreshed (Felsten, 2008).

The search for accessible and effective restorative environments has been an ongoing challenge for university campuses and cities, however, past research has reported promising evidence for green spaces as efficacious in providing recovery from stress and mental fatigue (Peschardt & Stigsdotter, 2013). Green spaces are defined as all publicly owned and accessible open spaces with a large amount of vegetation that have been seen to promote recovery from stress and mental fatigue (Schipperijn et al., 2010). This may be an integral part of the human experience as American biologist Edward O. Wilson used the term *biophilia*, which he defined, following Fromm (1964), as “the connections that human beings subconsciously seek with the rest of life”. Montgomery (2014) argues that humans are biologically programmed to find refuge, restoration and a sense of calm within nature. According to Montgomery, unlike built environments that demand voluntary attention and problem solving, natural spaces use involuntary attention, which is an effortless stream of thought and fascination that can lead to restoration, transformation and many other health benefits.

According to the study by Van Den Berg (2003), there was a positive association found between time spent visiting green spaces and mental health seen from the results from a questionnaire regarding psychological health and frequency of green space visits that was



administered to people in European cities. Grahn and Stigsdotter (2003) also found a significant relationship between green spaces and stress, as those who visited green spaces more often reported less stress-related illnesses. In addition, there has been a connection found between scale and access to green spaces, meaning that individuals use the green spaces closest to them (Grahn & Stigsdotter, 2003). For this reason, it is crucial to incorporate *pocket parks* (small spaces people pass on their journey to a destination) or other green strips that everybody can use for "mental refreshers" in their daily life (Montgomery, 2014). The study by Nordh & Østby (2013), found that urban spaces with natural elements and vegetation were the most restorative despite their size and that even small parks could satisfy the need for daily pedestrian contact with nature. Provided that built landscapes lead to negative health outcomes and exposure to nature is suggested to have many physiological and psychological benefits, it may be effective to develop more areas on campus into green spaces.

There has, however, been a lack of research looking specifically at green spaces on university campuses and its association with stress levels. One study by Felsten (2008) looked at the effect of nature murals inside university buildings as a study break. The findings indicated that the large murals of natural landscapes in university buildings provided attentionally-fatigued students with opportunities for restoration, particularly when views of nature were unavailable or limited. Another study used a photovoice methodology, where undergraduate students were instructed to take photos of the green spaces, they visited to alleviate stress and offer advice on how the green spaces might be improved (Seitz et al., 2014). Results showed that students enjoyed green spaces that feature benches and fountains, as well as exclusively natural spaces. Overall, the results of the few studies that have been done suggest that higher perceived campus

greenness is associated with a greater quality of life and a sense of restoration in university students (Hipp et al., 2016).

Attention Restoration Theory (ART) created by Herzog et al. (2003), outlines the components a setting should include to promote recovery from mental fatigue. According to their research, there are four components that a restorative environment must have to be effective: *being away* (generating mental content that differs from the ordinary), *extent* (a place with sufficient content to occupy the mind for enough time for voluntary attention to rest), *fascination* (a place that creates soft, peaceful attention) and *compatibility* (an environment that supports the person's purposes) (Herzog et al.).

Although the majority of past research has taken place in the spring and summer, it is important to note that the ART theory does not specifically mention the need for green vegetation or warm weather in the restorative environment. Therefore, the ecological space could also be restorative during the winter months. There is a lack of research conducted during the more-desolate and cold months of the year. However, considering that many people suffer from Seasonal Affective Disorder, a type of depression that surfaces during the winter from a lack of light, there is a need to establish forms of restoration and stress reduction for the winter season. In addition to, Seasonal Affective Disorder many students also suffer from high levels of stress during the winter not only because of the shorter days and colder weather but also due to the academic pressures that come with exams and final papers.

Considering there have been only a few studies conducted with respect to green spaces on university campuses, there seems to be a lack of research about nature's ability to alleviate student stress specifically (Seitz et al., 2014). There also appears to be a lack of information

about the effects of nature exposure in the wintertime. As a result, it would be useful to look at the benefits of nature in a university student population and during the colder months of the year.

The objective of the current study was, therefore, to see whether campus green spaces are restorative and capable of improving the well-being of undergraduate students during the cold, grey months of February and early March. The present experimental study compared positive affect and the overall well-being of undergraduate students after a walk-in nature versus a walk-in a regular part of campus. Past research suggests that participants in the nature condition should display greater overall well-being compared to those in the concrete campus condition. The results of the current study may aid in designing more restorative campuses that can help in promoting positive mental health amongst university students.

## **Method**

### *Participants*

The current study included 29 participants. Considering the focus was on university campus green spaces, all of the participants were undergraduate students, in this case, at Huron University College or from the Main Campus at Western University. During February and early March of 2020, participants were recruited from the first-year psychology participant pool and through social media platforms. The mean age of the participants was 20 years old, ranging from age 18 to age 32. Nine of the participants were male, 19 were female and 1 participant identified as another gender.

### *Questionnaire*

An online survey on Qualtrics was administered to each participant. The survey included a consent form, demographic questions and a survey combining the Positive and Negative Affect Scale (PANAS) and the Profile of Mood State (POMS) questionnaire, creating a 50-item survey assessing the well-being of participants. The POMS questionnaire was a self-reporting measure that allowed an assessment of fluctuating affective mood states and consisted of 30-items, each rated on a five-point Likert-type scale from Never to Always (McNair & Heuchert, 2013). The questionnaire included items such as, “You feel rested”, “You feel mentally exhausted” and “Your problems seem to be piling up”. There were two rating options for assessing mood: the past week or right now. In the current study the option “Right now” was chosen for the assessment, in order to use the questionnaire as an assessment of the participants’ post walk mood. The analytically derived questionnaire was validated and found to be reliable through several independent factor analytical studies (McNair & Heuchert). The PANAS was also a self-reporting measure and included 20-items, each rated on a five-point Likert-type scale from Never to Always as well. Ten of the items indicated positive affect, including high energy, full concentration and pleasurable activity and 10 items were expressed in terms of negative affect such as distress, and a variety of aversive mood states (nervousness, anger, guilt) (Watson, Clarke & Tellegen., 1988). Watson, Clarke and Tellegen (1988) also found good reliability and validity for the PANAS.

Following the 50-item survey combining the POMS and PANAS that assessed overall well-being, participants answered the Perceived Restoration Scale (PRS). Hartig, Korpela,

Evans, & Garling (1997), have reported good reliability and validity for this scale to assure the Medway Valley Trail walk fulfilled the four components of a restorative environment (*being away, extent, fascination* and compatibility) and that the nature environment was more restorative than the concrete environment. The PRS questionnaire comprised 26 questions and measured the participant's experience of restorative qualities of a specific environment within the four components of *being away, extent, fascination* and *compatibility*. The four components were derived from research by Kaplan and Kaplan (1989) on what constitutes a restorative environment (Kaplan & Kaplan, 1989).

### *Environments*

Two different environments were used as locations in the study. The nature condition took place in the Medway Valley Trail behind Huron University College. The trail consists of a dirt path in a forested area. The trail runs along a river and is a completely natural space. The study took place in the winter, therefore, the plants and trees on the trail were not in bloom, as outlined in Figure 1.

The concrete condition was a path from Huron University College past the construction beside the Food Court, under Western Road, past the University Community Center, Weldon Library, and down University drive towards Alumni Hall. The walk is surrounded by grey buildings outlined in Figure 2 and is often a very congested and busy area of campus.

Figure 1.  
*The Medway Valley Trail*

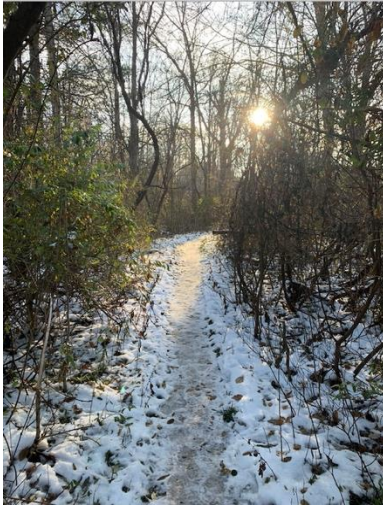


Figure 2.  
*The Concrete Campus Walk*



### *Procedure*

When participants arrived for the study, they were either randomly assigned to the nature condition or the concrete condition. Regardless of condition, the participants began the study at Huron University College and were asked to provide consent for their participation. Participants either completed the walks alone or in small groups of 2-5 people.

After preliminary instructions, those in the nature condition were guided to the beginning of the Medway Valley Trail behind Huron University College and those in the concrete condition were guided on the walk-through campus. Participants in both conditions engaged in a 10-minute walk through their assigned environment, followed by a 5-minute rest at the end of the journey. During the walk, participants were asked to find different items in their assigned environment. In the nature condition, participants were asked to count the number of bird's nests on the trail and participants in the concrete condition were asked to count the number of garbage cans on their campus walk. The counting of objects was used to disguise the goal of the study, as walking in

nature as a form of therapy has been quite popular in the media recently. The counting of objects was also designed to help participants focus on their surroundings.

Considering the cold weather, after the walk, participants were taken into a nearby building and asked to complete an online Qualtrics survey using their smartphones. Participants were then escorted back to Huron and debriefed on the study.

## Results

The scores from the 30-item POMS questionnaire and the 20-item PANAS questionnaire were added together to create an overall well-being score. The items of each scale that assessed negative affect were reverse scored. The items of the PRS that were negative were reverse scored as well before the final result of these 26-items were calculated, creating restoration scores for each environment.

The above calculations were conducted in Microsoft Excel; however, all the rest of the statistical analyses were conducted using the statistical program, SPSS Version 26 and all statistical tests were conducted using a 0.05 significance level.

An independent samples t-test was conducted to examine whether the dependent variable, which was the total score from the two well-being questionnaires, significantly differed between the two conditions (nature and concrete). The participants in the nature condition who walked through the Medway Valley Trail ( $M = 161.94$ ,  $SD = 21.13$ ) did not have significantly higher overall well-being scores than the participants in the concrete condition who walked through a busy section of campus ( $M = 155.31$ ,  $SD = 10.36$ ),  $t(27) = 1.03$ ,  $p < .05$ ,  $d = 0.39$ .

A multivariate analysis of variance (MANOVA) was conducted on the Perceived Restoration Scale scores, as a validity check for the effectiveness of the independent variables (the two environments: nature and concrete). According to the one-way MANOVA, there was a significant difference between one or more of the 4-components of the PRS and the assigned environment,  $F(4, 23) = 2.95, p < .05$ ; Wilk's  $\Lambda = 0.661$ , partial  $\eta^2 = .34$ . The multivariate effect size was estimated at .34, which implied that 34.0% of the variance in the PRS scores were accounted for by the assigned environment. The results from the MANOVA of the PRS questionnaire are shown in Table 1 in the Appendix.

Before conducting a follow-up ANOVA, the homogeneity of variance assumption was tested for all four PRS components. Based on a series of Levene's F tests, the homogeneity of variance assumption was considered satisfied. A series of one-way ANOVA's on each of the four dependent variables were conducted as a follow-up test to the MANOVA. As can be seen in Table 2 in the Appendix, the factor of *being away* was the only one that was statistically significant, with an effect size of .144.

## Discussion

It was hypothesized that students would have higher overall well-being after a walk in a natural landscape compared to a similar walk in a regular, grey part of campus as found in past research. For instance, the study by Nordh and Østby (2013), found that urban spaces with vegetation were the most restorative and the study conducted by Grahn and Stigsdotter (2003), found that out of the 953 inhabitants of Swedish cities who answered the questionnaire about their health and use of green spaces, those who visited green spaces reported lower stress levels



and less stress-related illnesses. Despite the positive results in past studies the combined score derived from the PANAS and the POMS in the current study did not show significantly higher overall well-being scores between participants in the two environments. One possible reason for the lack of significant results might be the length of the walk as, although past studies were successful using 15-minute walks in the landscape, the same results were not found in the current study. A study conducted by Stigsdotter et al. (2017) did find significant results by exposing participants to their assigned environment for 15-minutes; however, the study took place during the spring and summer, when the forest environments would have been lush and green. It may, therefore, require a longer walk to derive a similar benefit from a more-desolate winter landscape. Future researchers may wish to experiment with longer time frames specifically when studying participants in winter weather.

Furthermore, the Medway Valley Trail was thought to be a restorative environment and meet the four criteria of *being away*, *fascination*, *extent* and *compatibility*. Following such predictions, the scores from the Perceived Restoration Scale (PRS) found that the trail did differ significantly from the campus walk with respect to “being away”, however, the other three components of the PRS did not differ significantly between the two environments. Future researchers should, therefore, complete validity checks of restoration in both environments before the study is undertaken to assure the concrete campus condition and the nature condition vary significantly in restoration. Considering Western University's campus is viewed as a pastoral campus with many green spaces, there may already be a sufficient number of trees and patches of beauty to be considered restorative. There are however many campuses across Canada and around the world that may not be as well designed. For instance, campuses that are found within more urbanized locations, like Ryerson University in Toronto, or Simon Fraser

University in Vancouver, may not have sufficient natural spaces and the addition of parks and trees may be beneficial.

The weather was also an influential factor that may have affected each environment, as it was not feasible to have all participants complete the study on the same day. Certain days of testing were bright and sunny, whereas other days were snowy or rainy. These variations in weather have been found to have a large impact on a person's mood and may have skewed the results. The impact of weather condition was seen in the study conducted by Keller et al. (2005), which found that pleasant weather improves mood and cognition, specifically in the spring when people have been deprived of it for so long, therefore the few days of sun may have improved the mood of participants even when walking around campus.

Season, location, climate and conditions may also be factors that influenced the results of the study. The study was conducted during the winter in London Ontario when the nature condition may have been less hospitable and inviting, with colder weather and a less visually appealing natural landscape than would be experienced during the spring, summer or fall seasons or during the winter in a less extreme climate.

Most studies done on the topic of urban green spaces have used a correlational design, making the results hard to interpret, as they do not permit causal conclusions. These Cross-Sectional studies, which issued surveys to urban populations regarding usage of green spaces did, however, find positive results as seen in the study by Nordh and Østby (2013), the study by Peschardt et al. (2012), the study by Grahn & Stigsdotter (2003) and many more. Despite the success of Cross-Sectional studies, there has only been a very small number of experimental studies done on this topic, specifically on university campuses. Although the results are far more

mixed in experimental research on green spaces, there remains a need for more experimental studies to help establish a causal relationship between well-being and environment.

There is also a need for better physiological stress biomarkers as self-reporting can be extremely biased and may not be completely reflective of one's true physiological response and sense of well-being. The results of studies using physiological measures have been mixed, with some studies showing positive results, such as the one by Hartig, Evans, Jamner, Davis and Gärling (2003) that found a positive relationship between exposure to nature and lower stress levels by examining ambulatory blood pressure. They found a reduction in participants' diastolic blood pressure after sitting in a room with a view of a tree and after walking in nature, whereas they did not find a reduction in diastolic blood pressure after sitting without a view and walking in an urban setting. On the other hand, Stigddotter et al. (2017) did not find a significant difference between the physiological measures of blood pressure and heart rate variability in participants walking in an urban space versus a forest landscape. As a result of the inconsistent results, there is a need for better physiological biomarkers and future researchers may want to use both physiological and psychological measures when testing the well-being of participants.

Although the results were not in accordance with past Cross-Sectional studies there remains a need for further experiments in this up-and-coming area of research. There are many implications for the research in implementing campus green spaces as a university public health strategy that may help prevent student anxiety, depression and overall stress, particularly during the winter exam season.

This area of research becomes even more relevant in the current Covid-19 pandemic as people all over the world self-isolate due to the impending effects of Covid-19. We have seen

people flocking to parks, beaches and outdoor green spaces within cities, presumably to avoid the monotony and boredom of indefinite indoor life. This raises the question of why people are in need of fresh air and exposure to natural settings during stressful times? One possible answer is the need for an improved sense of well-being during a time of crisis and to reduce the stress and anxiety that is heightened during periods of uncertainty and fear, such as during a pandemic. For generations, philosophers, scientists and writers have discussed this everlasting human need for ecological spaces to clear the mind, restore one's cognitive capacities and allow for a meditative space away from human society.

### **Conclusion**

The current study examined the link between campus green spaces and student well-being at Western University. Although the results were not significant, future researchers should continue to explore the impact of campus green spaces in the winter months on well-being using experimental designs and including more physiological measures. Researchers should also assure the selected environments meet all four components of restoration – *being away*, *extent*, *fascination* and *compatibility*. The lessons learned from this study may provide valuable insights for further research in this area.

"In every walk with nature, one receives far more than he seeks"

- John Muir

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## Appendix

**Table 1**

**Multivariate Analyses of Variance on Perceived Restoration Scale Scores and the Two Study Environments**

MANOVA	Wilk's $\Lambda$	F	Error df	p	Partial Eta Squared
	0.66	2.92	23.00	0.042	.34

\*Statistically significant difference:  $p < 0.05$

**Table 2**

**ANOVAS of each Component of the Perceived Restoration Theory**

Variable	<i>Sum of Squares</i>	<i>F</i>	<i>df</i>	<i>Mean Square</i>	<i>p</i>	Partial Eta Squared
Being Away	310.95	4.38	1	310.95	0.046	0.14
Fascination	475.39	3.23	1	475.39	0.084	0.11
Extent	67.04	3.83	1	67.04	0.061	0.13
Compatibility	4.81	0.08	1	4.81	0.785	0.00

\*Statistically significant difference:  $p < 0.05$

# Justine Albert

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## Education

- Earl Marriott Secondary, 2016 (Valedictorian)
- Copenhagen University, January 2019 – June 2019
- Bachelor of Arts, Psychology, Honours Specialization - Huron University College at Western University (Expected Graduation 2020)

## Professional History

- Semiahmoo Speech Services – Speech Pathology Internship (2016)
- Western Sport & Recreation Services, Head Lifeguard (2017 – Present)
- City of Surrey, Lifeguard and Instructor (2015 – Present)
- Courtice Family Practice, Physician's Assistant (May 2018)
  - Wrote and created charts while doctor spoke with patients
  - Took patients' blood pressure
  - Attended house calls and in clinic evaluations
  - Provided patient support and reassurance

## Awards and Achievements

- Huron University College Academic Awards
  - Quantitative Statistics Award 2019
  - Poetry Award 2019
  - Praxis Book Award 2018
- Huron University College Centre for Undergraduate Research Summer Fellowship (2019)
- SB-50 United Nations Climate Change Conference in Bonn, Germany, 2019
- Queen's University Commerce Engineering Environmental Conference Delegate 2018 & 2020
- Huron University College Student Council (HUCSC):
  - MyEnviro Commissioner (2018)
  - Student Events Commissioner (2017)
  - Orientation Mentor or Soph (2017-2019)

## Published and Presentations

- Curl Undergraduate Conference, 2017 & 2020

## Grants and Scholarships

- Hellmuth Entrance Scholarship at Huron University College